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Distribution and Collection of the Non-timber Forest Product, Gaharu, along the Upper Streams of the Baram River in Sarawak

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Introduction

Gaharu is a forest product from rainforests in India and eastwards throughout Southeast Asia. Some species of trees in the genus *Aquilaria* which belong to the Thymelaeaceae family accumulate resin in parts of their trunks. The resin forms aromatic nodules called gaharu.

Gaharu has a long history as a traded good (Dunn, 1975, Lim and Parid, 2001). A Chinese document from the third century already recorded that gaharu was imported from Southeast Asia. Hong Kong, as its Chinese characters demonstrate, flourished as an entrepot port to deal with aromatic woods.

Gaharu needs to be burned or heated for the fragrance to be released. The fragrance of gaharu can be quite faint and subtle, but profound. In Islam and Buddhism, gaharu in the form of wood chips or incense is necessary for religious acts in order to purify the space. Gaharu is also used as Chinese herbal medicine for asthma and gastrointestinal fragility, because of its calming effect. In Japan, the art of incense ceremony using gaharu became established as Koh-doh in the Muromachi era (1336-1573), and is still performed by enthusiasts today (Morita, 1992).

Gaharu is one of the most expensive forest products in the world. The price of gaharu sold as wood pieces or small chips varies with quality (grade). Long established retail shops in Japan are selling the best gaharu for 10,000 yen (US$ 90) per gram, making it much more expensive than pure gold or platinum. In 2004, all species of *Aquilaria* were subject to trade controls under CITES appendix II. However, because it is relatively easy to carry, a large volume of gaharu is allegedly traded illegally (Soehartono and Newton, 2001: 37).

This paper has four purposes. First, it aims to examine the distribution characteristics of gaharu trees in a community with primary forest. Second, the paper makes a comparison with the distribution characteristics under other land use patterns. Third, the paper shows the methods by which local gatherers extract gaharu. Fourth, it is shown how much the sale of gaharu contributes to the local economy.

Location for Research

The location for this research is Village L, a Penan village in the upper reaches of the Baram River in Sarawak, Malaysia. The Penan is a hunter-gatherer of the Borneo rainforest. Among 6,000 Penan people living along the Baram River, around 300 are nomadic, and the others lead settled or half-settled lives.

In order to reach village L, one must drive along the logging road from Miri, a coastal city, for 10 hours and then walk for two more hours (See Figure 1). Primary forest without any commercial logging is still continuous around the village. The village comprises 28 households and 118 people, with a make-up shown in Figure 2.

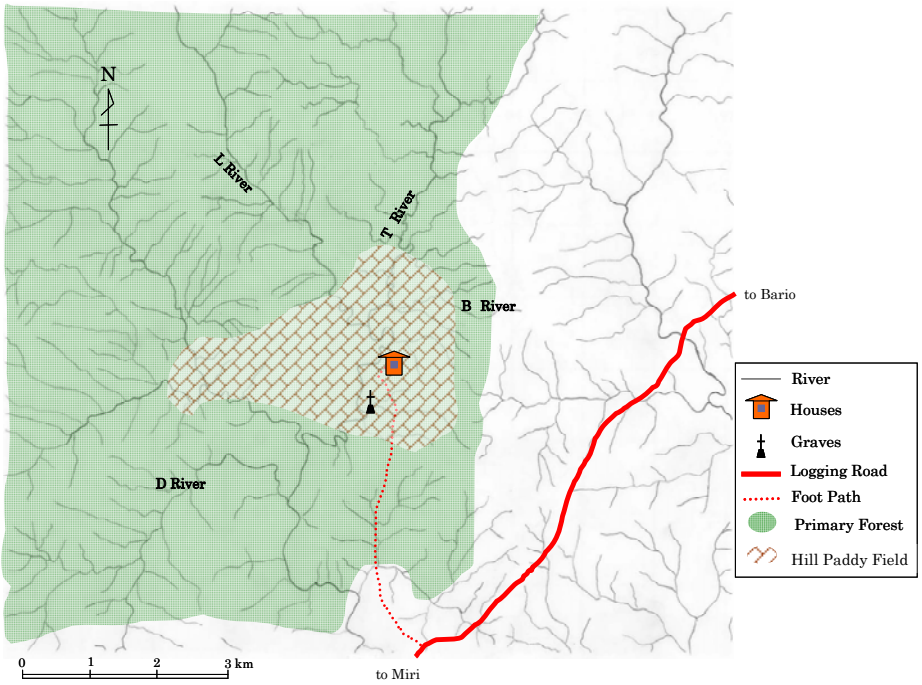

Fig. 1. Map of Village L

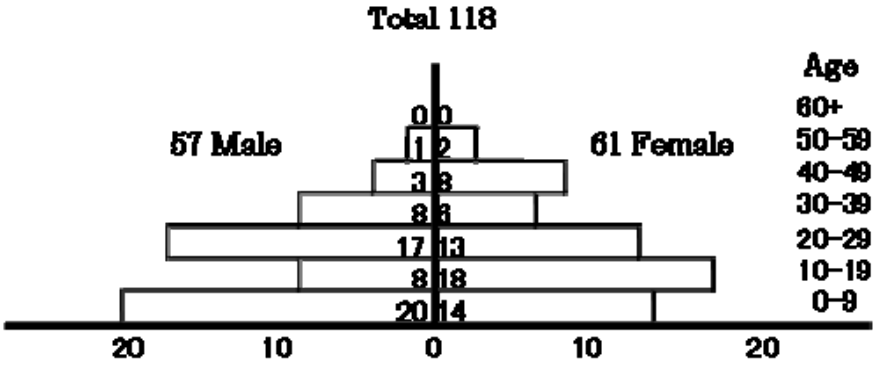

Fig. 2. Population composition of L Village

People in village L live by hunting with blowpipes and gathering, and also by shifting cultivation. The average area for shifting cultivation per household is 2.33 acres. Their relatives living nearby taught agriculture to them, but the relatives themselves had learned agriculture from farming peoples such as the Kelabit and the Saban.

Research Method

The field survey was conducted in August 2004. L Villagers went along and cooperated in the field survey. First, we walked around a total of 90 ha along the B River, D River, T River, and L River in primary forest areas. We used GPS (MAP60-CS-AP) made by Garmin for estimating the geographical position and also PC software (Trip and Waypoint Manager) in order to estimate the size of the area. The reception of GPS signals that we attempted near the trees was about 60%. We took photos and kept records of all individual gaharu trees. We used Vertex III made by Haglof in order to estimate the height of the trees. We used a tape

measure to measure the diameter. As for the degree of decay of felled trees, we used the following four degrees estimated visually:

Degree 1: Immediately after felling, with green leaves

Degree 2: Sapwood is decayed

Degree 3: Heartwood is decayed, sapwood is missing

Degree 4: Most decomposed

In order to make a comparison, we carried out same research in 50 ha of secondary forests eight years after commercial logging and 40ha of secondary forests three- to ten-years after shifting cultivation, and in 10 ha of secondary forests 15 years after shifting cultivation.

I interviewed the villagers as for the amount and quality of extracted gaharu over a month, and was shown actual samples.

Result

Species of Gaharu

Gaharu taken in Village L are of two species: *Aquilaria microcarpa* and *Aquilaria beccariana*, both belong to the Thymelaeaceae family. *A. microcarpa* is called Gaharu Tokong, which means mountain Gaharu in Penan language, and *A. beccariana* is called Gaharu Ba, which means river Gaharu in Penan. *A.* malaccensis can be also seen in other areas in Sarawak, but it does not grow here.

Extraction Method

When Penan look for a gaharu tree in the forest, they pay attention to fallen leaves and tree bark. As soon as they find a fallen leaf, they can immediately find the tree nearby. It is reported that in Indonesia, when one finds a gaharu tree, one cuts down the tree whether it contains resin or not (Soehartono and Newton, 2001). However, Penan in village L make a little cut on the tree bark and if they find that there is a little resin, they use an ax or a knife to cut out only the part where resin has accumulated. If a gaharu tree is not cut down, the tree may accumulate resin again. It takes several months or several years to accumulate resin.

Gaharu Trees Distribution

We recorded 73 gaharu trees in the total of 90 ha primary forest around the village (Table 1). They were all *A. beccariana*. Table 2 shows data for tree heights and diameters. The felled trees are also contained in the number. The average tree height was 9.1m and the average diameter was 11.4 cm. Of these trees, 11 that were believed to contain a relatively large amount of resin were cut down by villagers. It turned out that not all gaharu trees generated resin, but only relatively mature trees generated it. All four trees whose height was over 18 m and whose diameter was over 28 cm were cut down. As for the degree of decay, two trees were in Degree1, two in Degree 2, five in Degree 3, and two in Degree 4. If we exclude two felled trees that were decayed so much and did not retain their original forms, the average tree height of the felled trees was 15.5 m and the average diameter was 19.9 cm.

In contrast, as Table 3 shows, in about 50 ha of eight-year commercial logged forest, there were only two

gaharu trees. In about 40 ha of secondary forests for three to ten years after shifting cultivation, there was no gaharu tree. In about 10 ha of secondary forests for fifteen years after shifting cultivation, there was only one gaharu tree.

Table 1. Gaharu trees distribution in primary forest

Location	Area (ha)	No. of gaharu trees	Distribution density	No. of felled trees
Around B river	12	17	1.41	6
Around D river	32	14	0.43	2
Around T river	30	20	0.67	2
Around L river	16	22	1.38	1
Total	**90**	**73**	**0.81**	**11**

Table 2. Size of the gaharu trees in primary forest

Height	Diameter at breast height					
	>28cm	27.9-20cm	19.9-10cm	9.9-6cm	<5.9cm	Tatal
>18m	4(4)	3(1)	2(1)	0	0	**9(6)**
17.9-10m	1	5	6	6(1)	0	**18(1)**
9.9-5m	0	2	2	12(1)	8	**24(1)**
4.9-2m	0	0	0	1(1)	14	**15(1)**
<1.9m	0	1(1)	0	1(1)	5	**7(2)**
Total	**5(4)**	**11(2)**	**10(1)**	**20(4)**	**27**	**73(11)**

( ) number of felled trees

Table 3. Gaharu trees distribution in secondary forests

Land use	Area(ha)	No. of gaharu trees	Distribution density
8 years after commercial logging	50	2	0.04
3-10 years after shifting cultivation	40	0	0.00
15 years after shifting cultivation	10	1	0.10

Table 4. Villagers' one-month income from gaharu (August, 2004)

Name	Days	Area(ha)*	Quantity(kg)	Quality	Price (RM)
Mr. G	5	150	0.15	Grade3	**90**
Mr. K	20	600	1.6	Grade3	**1,040**
Mr. S	20	600	0.1	Grade1	**200**
			3	Grade4	**15**
Total	**45**	**1,350**	**4.85**		**1,345**

* The extraction area per day is presumed to be 30ha.

Income for Villagers

During the month of August 2004, three villagers collected 4.35 kg of gaharu from an estimated 1,350 ha of forest. In reference to the prices that Kayan brokers use (first grade: RM2,000 per kg; second grade: RM1,500 per kg; third grade: RM650 per kg; fourth grade: RM50 per kg; and fifth grade: RM3 per kg), this amount would be equal to RM1,345 (US$366) (See Table 4). For L villagers, Gaharu is the biggest source of income and their rattan handicrafts are second.

Conclusions

73 gaharu trees were distributed in about 90 of ha primary forest around the Village L. Habitat density is lower than one per ha. It turned out that not all gaharu trees generated resin, but only relatively mature trees generated it. When land use such as commercial logging or shifting cultivation is introduced, the habitat of the gaharu trees is subjected to destructive damage. The Penan in village L do not cut down all gaharu trees, but cut out only parts where resin has accumulated with an ax or a knife and let the tree survive. Gaharu is the biggest source of income for the L villagers.

The present situation of the gaharu wood habitat

Today, in Sarawak, except for National Parks and Wildlife Sanctuaries, very few areas of substantial-sized primary forest remain; however, in the upper reaches of the Baram River, a sizable forest without any logging operation still remains. Today, approximately 18,000 ha of primary forest exists within the boundaries of the village that people in Village L recognize. When we apply the distribution density that we have acquired to the 18,000 ha, it is estimated that there should be about 15,000 gaharu trees within the village boundaries.

In October 2004, the Malaysian Timber Certification Council (MTCC) granted a certificate to a private logging company to “manage” the remaining 55,000 ha of primary forest that neighbors Village L. The Penan people living inside are making protests regarding this certified logging because the MTCC certificate does not recognize their native customary rights.

In the forest industry, timber has been recognized as the major forestry product and others as minor. However, it was only a few decades ago that people started focusing on timber in the rainforest. The export of non-timber products, as trading goods, surpassed that of timber until half a century ago. In extracting non-timber products including gaharu, it is possible to ensure certain productivity without necessarily felling the trees. In comparison with timber, these products were traded for much more appropriate prices. As a result, profits have been returned to local gatherers. In order to conserve the rainforest, the lives and cultures using it, it is necessary to review forest values other than timber and to devise policy options to secure sustainable use of forest products.

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